

Claims

What is claimed is:

1. A method for packaging a small size memory card comprising a populated printed circuit board (PCB), said method comprising the following steps:
 - (a) providing the populated printed circuit board in a mold; and
 - (b) molding over the populated printed circuit board to encapsulate the populated printed circuit board, thereby providing the small size memory card with standard external dimensions and features.
2. The method of claim 1, wherein both the back side and top side of the populated PCB is encapsulated.
3. The method of claim 1, wherein the back side of the populated PCB is not encapsulated so that the back side forms one side of the encapsulated small size memory card.
4. The method of claim 1, wherein, in step (a), the populated PCB is held in place in a cavity of at least one mold piece of the mold.
5. The method of claim 4, wherein the populated PCB comprises at least one tie bar extending therefrom, and wherein the holding of the populated PCB in place in the cavity of the at least one mould piece comprises securing the at least one tie bar in place in the cavity of the at least one mould piece.
6. The method of claim 5, wherein the at least one tie bar extends to a peripheral frame which integrally and substantially surrounds the populated PCB, thereby holding the populated PCB in place in the cavity of the at least one mould piece by securing at least a portion of the peripheral frame.

7. The method of claim 6, wherein the peripheral frame is provided with a plurality of tie bars which are optimally distributed around said peripheral frame to prevent flexure of said populated PCB held within the at least one mould piece.
8. The method of claim 4, wherein at least one edge of the populated PCB is provided for holding said board in place for the encapsulating process in the at least one mould piece.
9. The method of claim 8, wherein one or more perforations through the PCB are provided to allow for the moulding compound to flow therethrough during encapsulation to provide for integral connection between said moulding compound on the two sides of the PCB.
10. The method of claim 1, further comprising the step of separating the complete encapsulated memory card from the holding means by any of methods including scribing-and-breaking, sawing, punching and cutting.
11. The method of claim 1, wherein the encapsulation process includes any one or combination of transfer moulding and injection moulding processes.
12. The method of claim 11, wherein the encapsulation is achieved by simultaneously molding over the populated PCB thereby forming the small size memory card at one step.
13. The method of claim 11, wherein the encapsulation is achieved by at two steps including any combination of molding over one side prior to the other side of the populated PCB or molding part of one side of the PCB prior to the rest.
14. The method of claim 1, wherein the populated PCB includes chip-on-board (COB) component mounted thereon.
15. The method of claim 1, wherein the populated PCB includes multiple chip modules (MCM) component mounted thereon.

16. The method of claim 14, wherein the chip-on-board component (COB) is mounted onto the board as any one of direct flip chip on board (FCOB), wire-bonded chips and other forms of interconnect between the chip and the PCB.
17. The method of claim 16, wherein the FCOB is a flash memory module.
18. The method of claim 17, wherein the flash memory chip module includes any one of a solder-bumped flip chip, wire-bonded chip and other forms of interconnect between the chip and the PCB, packaged on a land-grid array (LGA) chip scale package (CSP).
19. The method of claim 16, wherein the mounting of the COB on the board is a low-profile ball grid array (BGA).
20. The method of claim 1, wherein the standard external dimensions and features of said memory card include any one or combination of openings for contact pads or pins extending from the printed circuit board and write-protect means.
21. The method of claim 20, wherein the write-protect means is completed with a separate member inserted into a groove provided with the encapsulated card and slidable along said groove.
22. A small size memory card manufactured with a method according to claim 1.
23. A device installed with a memory card which has been manufactured with a method according to claim 1.
24. An apparatus, including at least a mold piece for carrying out the method according to claim 1.
25. A method for preventing contact pads of a populated print circuit board (PCB) from mold bleed during encapsulation for packaging a small size memory card, wherein the populated PCB has a back side with the contact pads and top side with at least one memory

chip, and wherein the populated PCB is encapsulated by molding compounds in a mold having a lower mold piece and an upper mold piece, said method comprising:

disposing a plurality of holding pins in the mold, prior to the molding, so that the holding pins clamps the contact pads against the lower mold piece from the top side of the populated PCB when the mold is closed, thereby the mold bleed onto the contact pads during molding is substantially or completely prevented.

26. The method of claim 25, wherein the holding pins have 75% or less in area corresponding to the contact pads.

27. The method of claim 25, wherein the holding pins are slidable along special slots designed in the upper mold piece.

28. The method of claim 25, wherein the holding pins are fixtures onto the upper mold piece.

29. A method for preventing contact pads of a populated print circuit board (PCB) from mold bleed during encapsulation for packaging a small size memory card, wherein the populated PCB has a back side with the contact pads and top side with at least one memory chip, and wherein the populated PCB is encapsulated by molding compounds in a mold having a lower mold piece and an upper mold piece, said method comprising:

disposing a support insert in the mold, prior to the molding, so that the support insert clamps the contact pads against the lower mold piece from the top side of the populated PCB when the mold is closed, thereby the mold bleed onto the contact pads during molding is substantially or completely prevented;

wherein the support insert has a knife edge in contacting the top side of the populated PCB.

30. The method of claim 29, wherein the support insert is slidable along special slots designed in the upper mold piece.

31. The method of claim 29, wherein the support insert is a fixture onto the upper mold piece.

32. A method for preventing contact pads of a populated print circuit board (PCB) from mold bleed during encapsulation for packaging a small size memory card, wherein the populated PCB has a back side with the contact pads and top side with at least one memory chip, and wherein the populated PCB is encapsulated by molding compounds in a mold having a lower mold piece and an upper mold piece, said method comprising:

covering prior to molding the contact pads with a temporary substrate coverage that is un-laminated, thereby the mold bleed onto the contact pads during molding is substantially or completely prevented.

33. A method for preventing contact pads of a populated print circuit board (PCB) from mold bleed during encapsulation for packaging a small size memory card, wherein the populated PCB has a back side with the contact pads and top side with at least one memory chip, and wherein the populated PCB is encapsulated by molding compounds in a mold having a lower mold piece and an upper mold piece, said method comprising:

clamping prior to molding the populated PCB against the lower mold piece by vacuum from special channels designed in the lower mold piece, thereby the mold bleed onto the contact pads during molding is substantially or completely prevented.

34. A method for preventing contact pads of a populated print circuit board (PCB) from mold bleed during encapsulation for packaging a small size memory card, wherein the populated PCB has a back side with the contact pads and top side with at least one memory chip, and wherein the populated PCB is encapsulated by molding compounds in a mold having a lower mold piece and an upper mold piece, said method comprising:

disposing prior to molding at least one dummy components onto the top side of the populated PCB in the corresponding area of the contact pads, wherein the at least one dummy component has such a height that when the mold is closed, the at least one dummy component will exert enough pressure over the contact pads to clamp the contact pads against the lower mold piece tightly, thereby the mold bleed onto the contact pads during molding is substantially or completely prevented.

35. A small size memory card manufactured according to any one of claims 25, 29, and 32-34.